



## **New Technologies in Bioremediation of Contaminated Soil**

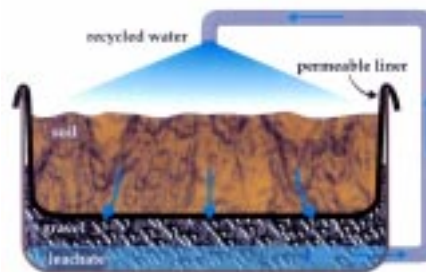
Land farming is a common bioremediation treatment option for soils contaminated with polycyclic aromatic hydrocarbons (PAHs). The process is based on the degradation of PAHs by natural microbial communities in the presence of aeration (mechanical tilling), fertilizer addition, and physical mixing. In general, considerable degradation of total PAHs occurs but the removal of the high molecular weight (HMW) PAHs (four or more aromatic rings), those that are of most concern from a regulatory and clean up standpoint, is very problematic. This is due many times to the absence of a key metabolic activity, namely the ability to cometabolize HMW PAHs, and to the lack of bioavailability of the PAHs to the degrading microorganisms.



The problem can be corrected, we believe, by bioaugmentation, or the process of adding cultures of microorganisms that have isolated from PAH-contaminated soil and enriched in laboratory studies. We have selected two key microorganisms for this

bioaugmentation technique, one that adds significant cometabolic capability for HMW PAHs and another that produces a biosurfactant, a chemical that increases the apparent solubility of PAHs and makes them more available for degradation. The characteristics of the organisms and the practicality of introducing them into soil has been studied in laboratory microcosms.

**NRL Land Farming Mesocosm**



Although bioaugmentation will add costs to the treatment process, it is likely that the improved reliability for removing HMW PAHs to below regulatory limits will eventually justify the added cost. We are planning transition in the next two years to a major field demonstration with PAH-contaminated soil.

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